

Investigating Factors that Influence Critical Literacy Competence of Pre-service Teacher in Early Childhood Education

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Abstract

This study was conducted to identify the factors that influence the critical literacy of pre-service teacher in the disciplinary literacy of Early Childhood Education. This research used structural equation modelling – partial least square (SEM-PLS) analysis. The purposive random sampling technique was chosen to determine the sample of respondents from first year to third year of ECE from one of the public universities in Gorontalo Province, Indonesia. Total of population were 556 pre-service teachers and 248 were the samples who filled questionnaires. Based on the analysis results, it was found that creative thinking and the ability to detect source and bias have a significantly in fluence on the critical literacy. This research has implications for developing literacy practice that combine both variables for optimization of critical literacy in the content area of Early Childhood Education, such as the integration of these variables in the assignment task.

Keywords: critical literacy; disciplinary literacy; creative thinking

1.

1. INTRODUCTION

Learning literacy in Indonesia has been at the center of attention since a few years ago. This situation is triggered by the result of the Programme for International Student Assessment (PISA) score assessing literacy and numeracy in Indonesia, which remains low, ranked 74 out of 77 countries in reading in 2018 [1]. Lower literacy, also shown by the BPS data (as cited from Adawiyah and Juariyah) [2], shows that 91.47% of school-age children prefer to watch television, and 13.11% like to read. Recognizing Indonesia's position is low, the government has implemented some programs, from early literacy intervention to adult learning. The importance of literacy is reflected through some programs established by the government, such as National Literacy Movement (Gerakan Literasi Nasional), the literacy corner in each school [3]. The focus on literacy also happens at the university level, for example, by many universities have implemented disciplinary literacy approach, which emphasises

the important of a set of abilities to create, communicate, and use the knowledge of specific discipline [4]. Through applying this approach, university students are expected to display an awareness and competence to deal with information given such as the author's bias and context.

One of the disciplinary literacies across content areas is literacy competence in teacher education of Early Childhood Education (ECE) programs. Literacy is a growing field that often refers to essential skills for every individual [5], one of them is critical literacy. Critical literacy often refers to the concept of cognitive process and practice skills of how literacy is applied [6]. According to López [7], critical literacy is a basic proficiency to acknowledge the choices or perspectives in written text and to discuss and critique discourses such as power, gender, or social issues. Additionally, critical literacy engages not only in the complexity of questioning and seeking alternative solution but also in reflecting our worlds for potential transformation. A study from Holyoke and Ries [8] further reveals that critical literacy as part of teacher preparation course has developed critical stances of pre-service teachers as readers and teachers to encounter the challenges, flexibility and resilience to engage in difficult conversation such as race, to become critically minded educators.

Early Childhood Education (ECE) is part of the transformation move of Indonesian education, and literacy has been actively promoted in this field. Several programs have been implemented in schools to boost literacy activities. However, the implementation of literacy has not been clearly explored in terms of pre-service education in ECE. Many pre-service teachers in ECE programs in Indonesia do not have critical literacy to support their learning. It is because the most common understanding of literacy is called "melek huruf", or literate, which means just the ability to read and write [9], [10]. Their understanding about literacy has impacted on the practices that they choose to apply, for example, teaching literacy to young children is mostly focussing on reading and writing [10]. While López [7] argues that pre-service teachers should actively exercise their critical literacy through deepening dimension and broadening their notions of what counts as texts, and reliable information, the literacy is only seen on the surface level of information. This hinder the exploration of critical literacy to engage both pre-service teachers and children to meaningful conversations. This issue shows that the need to have a comprehensive approach to implement literacy in all levels of education. The ineffective literacy practice in school should be traced from the pre-service teacher preparation program. Their awareness and understanding about literacy, especially critical literacy is worth to investigate. A number of research have investigated the factors influenced critical literacy in various disciplinary studies [11], [12]. This current study investigates identified factors that affects critical literacy of pre-service teachers in the Early Childhood Education program. The goal is to provide a comprehensive analysis of how each factor related to the critical literacy in specific disciplinary study.

2. Literature Review

1.1 Critical literacy competency of pre-service teachers in ECE

One of the content areas in the university is *Pendidikan Guru Pendidikan Anak Usia Dini* (PGPAUD) or known as Teacher Education of Early Childhood Education Department, which is a discipline that aims to develop ECE based on transformative scientific insights and conservation values for the realization of comprehensive, reliable and quality early childhood services [13]. In Indonesia, many people consider being a teacher in the Early Childhood Education (ECE) field does not require a high level of knowledge and cognitive process compared to other disciplines such as natural science. Nurhayati and Rakhman [14] find that many ECE teachers do not have qualifications in the field of ECE. In this situation, many people think that being an ECE teacher means you just have to be able to draw, sing and read. This assumption also happens in pre-service teachers of ECE that they do not need critical knowledge because they are only teaching young children. This assumption must be addressed to reflect on what they know and do not know about their own assumption [15]. This assumption is related to the characteristics of pre-service teachers that enroll in the program that they have the same prior knowledge or tenet that being ECE teachers does not require them to think hard. This situation may contribute to the fact that these pre-service teachers find difficulties developing their literacy learning in their content area.

This common understanding limits the exploration of literacy, especially critical literacy in the ECE context. Critical literacy is the concept that can be introduced to children at young age to provide them with different approaches. Critical literacy offers opportunities for teachers to explore and extend the activities to discuss social issues and engage children with different ways of thinking [16]. Additionally, through literacy, learning can be meaningful because it emphasizes social and cultural resources to explore the meaning of the context playfully. Literacy can be created through everyday life experiences where children are surrounded by feature environments such as menus and shopping lists [17].

Despite the importance of critical literacy, pre-service teachers in ECE often have limited engagement in the practice of critical literacy as part of their teacher preparation program [18]. Studies from Ifadah [10], Persada and Ediyono [19] show that pre-service teachers from different disciplines can promote critical literacy through their content areas for their future students. However, the way it will be promoted has not explored clearly in their learning. Additionally, the recent attention to literacy across content areas has put a new change to all departments in all universities in Indonesia to modify their curriculum. For example, every subject requires the pre-service teacher to show critical thinking in their case study assignment or project-based learning in their content areas. However, due to the current assumption of these pre-service teachers, most of them do not show their

critical analyses or fails to meet the criteria of higher order thinking skills. Therefore, the idea of critical literacy is relevant to the current need and demand of education. These pre-service teachers need to re-imagine on how to promote critical literacy to engage and put their full potential [20].

1.2. Factors related to critical literacy competence in teacher education of ECE

Many changes need to be made to integrate literacy practice in content areas of teacher education of ECE. It is essential to understand the prior knowledge of pre-service teachers about literacy, and it can start with identifying their weaknesses, strengths, and interest in literacy. It can start with a survey or mapping pre-service teachers' critical literacy competencies. The step is essential because it can help them eliminate and dismiss their assumption that ECE teachers do not need to possess such intellectual traits. After all, they teach young children. Redefining the role and identity of ECE teachers can start in the teacher education of pre-service ECE teachers by setting high expectations that incorporate their prior knowledge and experiences into their learning and critical knowledge in their content area. As Bloome and Enciso [21] mention, the ways literacy practices are structured help provide meaning, choice, and constraint to construct social relationships and identities.

Luke [22] identifies that critical literacy should consist of learning how texts work, understanding and remediating what texts attempt to do in the world and to people, and moving students toward active position-taking with texts to critique and reconstruct the social fields in which they live and work. It shows that critical literacy consists of a set of skills that are interconnected [23]. The ability to think critically, to detect bias and source of information, to read critically and creatively are the essence of critical literacy [24], [25], [26], [20]. First, critical thinking enhances the construction of knowledge, by questioning information to make rational judgments, solutions or outcomes. Critical thinking forces people to evaluate the overall understanding of information thoughtfully that can possibly improve the quality of life [23]. Importantly, applying critical thinking to critical literacy is like extended our ability to unpack and analysis all kinds of information accurately. Second, having the ability to detect bias and reliable sources is a major part of critical literacy [27]. Pre-service teachers are expected to review, interpret and judge various sources and forms of knowledge in relation to their content areas.

Furthermore, the relationship between text and reader is crucial to develop the textual engagement and experiences of critical literacy [8]. Reading critically helps pre-service teachers to make sense of their complex world and link it to their content areas. Importantly, the pre-service teachers should develop the ability to read critically for both factual and implicit information presented in the multimodal forms as well as the context. Critical literacy can also be viewed as a set of social and cultural practices, deriving from the political, social and cultural contexts in which

they are learned. Information provided should be analyzed through various of lenses including the context surroundings the text. Finally, to engage in critical literacy means pre-service teachers have to engage in different communication modes [12]. This requires creative thinking to utilize multimodal communication and express their ideas in the most effective way. Therefore, the relation and influence between these factors can be useful to provide information that can contribute to develop critical literacy activity for pre-service teacher's education.

2. METHOD

2.1 Research Design

This study used quantitative methods to investigate the relation between identified factors (critical thinking, detecting sources and bias, critical reading and creative thinking) and critical literacy of pre-service teachers in ECE.

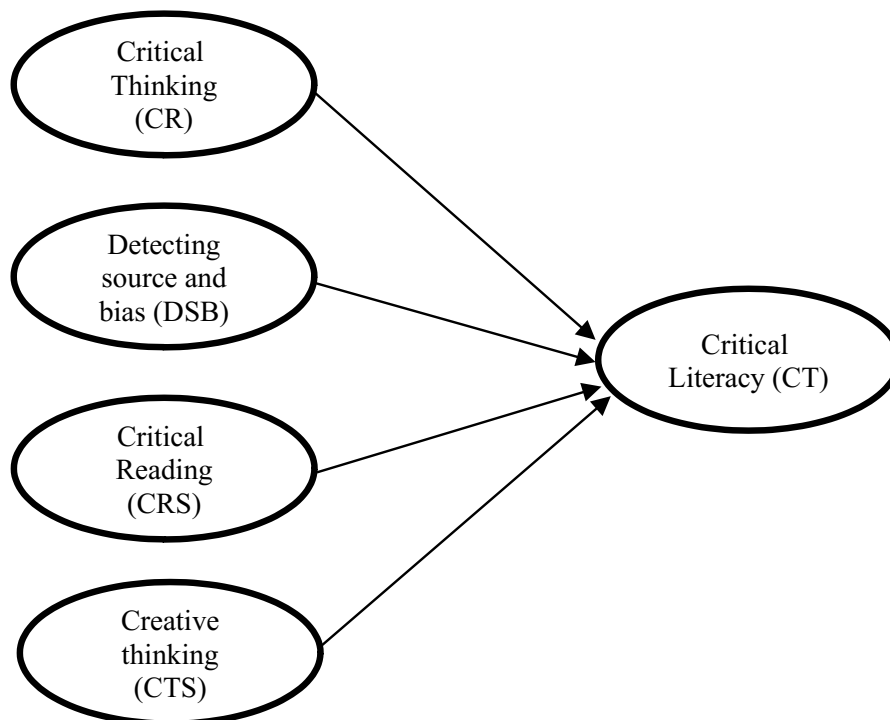


Figure 1. Research design

Critical thinking refers to the ability of pre-service teachers in ECE to enhance the construction of knowledge, by questioning information to make rational judgments, solutions or outcomes. Critical thinking forces people to evaluate the overall understanding of information thoughtfully that can possibly improve the

quality of life [23]. Importantly, applying critical thinking to critical literacy is like extended our ability to unpack and analysis all kinds of information accurately. Meanwhile, having the ability to detect bias and reliable sources is a major part of critical literacy [27]. Pre-service teachers are expected to review, interpret and judge various sources and forms of knowledge in relation to their content areas [12]. The relationship between text and reader is crucial to develop the textual engagement and experiences of critical literacy [8]. Reading critically helps pre-service teachers to make sense of their complex world and link it to their content areas. Importantly, the pre-service teachers should develop the ability to read critically for both factual and implicit information presented in the multimodal forms as well as the context. Critical literacy can also be viewed as a set of social and cultural practices, deriving from the political, social and cultural contexts in which they are learned. Information provided should be analysed through various of lenses including the context surroundings the text. Finally, to engage in critical literacy means pre-service teachers have to engage in different communication modes [12].

The research model developed is presented in Figure 1. Critical thinking, detecting source and bias, critical reading and creative thinking are main factors that are related to critical literacy. It has created a model to measure critical literacy of pre-service teachers in ECE. The following are the hypotheses raised in this study:

H1. Critical reading (CTS) has a positive and direct effect on critical literacy (CL).

H2. Critical thinking (CT) has a positive and direct effect on critical literacy (CL).

H3. Creative thinking skill (CTS) has a positive and direct effect on critical literacy (CL).

H4. Detecting source and bias (DSB) has a positive and direct effect on critical literacy (CL).

2.2 Population and Sample

The population of the study were 556 pre-service teachers of ECE from a public university from Gorontalo Province, Indonesia. The determination of the sample was based on the minimum sample requirements in predicting the model using the PLS-SEM method by utilizing the SMARTPLS application [28]. The samples taken for this study were 223 pre-service teachers in ECE.

2.3 Data Collection Technique

The data in this study were collected using an online questionnaire using the Google form application to be given to respondents. The instrument used for the questionnaire refers to the four factors influenced critical literacy (Table 1). The assessment on this research questionnaire used a Likert scale of 1–4 with the information: strongly disagree, disagree, agree, and strongly agree.

Table 1. Instrument used to measure and assess critical literacy of pre-service teachers in ECEC

Variables	Codes	Items
Critical thinking	CT1	I compare information from different sources.
	CT2	I contrast the findings from other sources of information.
	CT3	I become a well-informed individual in discussions.
	CT4	I become an individual who actively evaluates dominant narratives through valid information
	CT5	I use higher order thinking skill to analyzing or evaluating information.
	CT6	I reflect on literacy practices (for example, discussing, arguing or understanding information written or orally) in my daily activities.
Detecting source and bias	DSB1	I interpret or evaluate information through text, or other multimedia sources.
	DBS2	I question or evaluate information provided through text, or other multimedia sources.
	DBS3	I enrich my knowledge with various sources of information.
	DBS4	I evaluate different perspectives in the text or other information.
	DBS5	I evaluate the assumptions in the text or other information.
	DBS6	I evaluate the values in the texts or other information.
	DBS7	I involve myself with different modes of communication in literacy learning or to obtain information.
Critical reading	CRS1	I understand what the text is trying to do to the reader.
	CRS2	I take an active position as a reader of the text or media model used.
	CRS3	I take an active position as a reader regarding the information content in the text.
	CRS4	I reconstruct the social field in the context of the text.
	CRS5	I reconstruct the social field to explore the meaning contained in information.

	CRS6	I educate students toward critical engagement with text across modes both digitally and in more traditional ways.
	CRS7	I can navigate complex information.
Creative thinking	CTS1	I understand the expression of information through different multimodal or multiliteracies.
	CTS2	I understand the expression of information through four models of literacy practice (coding breaker, text participant, text user, and text analyst).
	CTS3	I engage in different modes of communication or information as part of literacy learning.
	CTS4	I actively voice opinions or explore diverse perspectives.
	CTS5	I engage in group dialogue to support critical literacy views.
	CTS6	I actively collaborate to express my thoughts in oral and written media.
	CTS7	I write a diary about my experiences.
Critical literacy	CL1	I discuss social issues as part of critical literacy.
	CL2	I provide criticism on discourses or issues that exist in everyday life as part of critical literacy.
	CL3	I explore or expand discussions that involve different ways of thinking as part of critical literacy.
	CL4	I explore the meaning of context contained in the text or non-text information as part of critical literacy.
	CL5	I understand that critical literacy focuses on understanding reading texts.
	CL6	As a pre-service teacher, I involve or apply a critical literacy attitude in determining the position or meaning of the text.
	CL7	I check information sources, for example websites, as part of critical literacy practice.
	CL8	I always combine various sources of information from online media or social media.
	CL9	Critical literacy helps me express comprehensive thoughts both orally and in writing.
	CL10	As a pre-service teacher, I apply a critical literacy attitude in collaborating to produce knowledge or

		accept various perspectives.
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a. 2.4 Data Analysis Technique

The analysis technique used is PLS-SEM analysis. At the beginning, the researchers analyzed the demographic data of the respondents based on gender and academic term level. Then the researchers conducted a PLS-SEM analysis to test the outer and inner models. In the outer model, convergent validity, composite reliability, average variance extracted, and discriminant validity were tested. While in the inner model, path coefficient (β), effect size (f^2), coefficient of determination (R^2), and T Statistics were tested.

Convergent validity testing is used to determine the validity of each relationship between indicators and their constructs. Composite reliability testing is carried out to determine the value of construct reliability. The average variance extracted testing is used to determine the convergent validity of a construct. Discriminant validity testing is used to determine reflective indicators to be a good measure of the construct. This test is carried out by looking at the cross-loading value to compare the correlation between indicators and constructs.

The path coefficient (β) testing is carried out to measure the significance and strength of the relationship between constructs. Effect Size (f^2) testing is used to see the magnitude of the influence between constructs. The coefficient of determination (R^2) testing is carried out to see how the exogenous constructs explain the endogenous constructs. The T Statistics testing is used to test the research hypothesis by comparing the T Statistics value with the T table value.

3. RESULT AND DISCUSSION

3. Outer Model Testing

Model measurement analysis or outer model was conducted through four tests, which were convergent validity, composite reliability, average variance extracted and discriminant validity.

a. Convergent validity testing

Convergent validity was conducted to see the validity of each influence between the indicator and the construct using the recommended loading value of 0.7 [29]. The convergent validity testing is depicted in the table 2.

Table 2. Result of convergent validity testing

	CL	CRS	CT	CTS	DSB
CL1	0.734				
CL2	0.735				
CL3	0.759				
CL4	0.825				
CL5	0.75				
CL6	0.697				
CL7	0.741				
CL8	0.724				
CL9	0.787				
CL10	0.671				
CRS1		0.747			
CRS2		0.768			
CRS3		0.767			
CRS4		0.752			
CRS5		0.764			
CRS6		0.779			
CRS7		0.809			
CT1			0.658		
CT2			0.666		
CT3			0.695		
CT4			0.791		
CT5			0.751		
CT6			0.756		
CTS1				0.812	
CTS2				0.794	
CTS3				0.778	
CTS4				0.784	
CTS5				0.797	
CTS6				0.839	
CTS7				0.636	
DSB1					0.755
DBS2					0.766
DBS3					0.709
DBS4					0.802
DBS5					0.781
DBS6					0.797
DBS7					0.747

b. Composite reliability testing

Composite reliability testing aims to determine the construct reliability value. The recommended composite reliability value is 0.7 [30]. Based on the test results in table 3, the constructs have met the standard value of more than 0.7 so that all constructs have good reliability values.

Table 3. Composite reliability testing

Construct	<i>Composite reliability</i>
CL	0.925
CRS	0.910
CT	0.866
CTS	0.915
DSB	0.908

c. Average variance extracted testing

The average variance extracted test aims to see the convergent validity of a construct. Convergent validity is determined by requiring an average variance extracted value of 0.5 [31]. The table 4 shows the result of testing.

Table 4. Result of average variance extracted testing

Construct	<i>Average variance extracted (AVE)</i>
CL	0.553
CRS	0.592
CT	0.520
CTS	0.608
DSB	0.586

d. Discriminant validity testing

Discriminant validity testing aims to ensure that the indicator can be a good measure of the construct. This test was conducted using cross loading, the good standard value of cross loading is if the correlation between the indicator and the construct is higher than the correlation with other constructs. Based on the test results (table 5), it was found that the cross loading value met the discriminant validity test because the correlation between the indicator and the construct had a higher value than with other constructs.

Table 5. Result of discriminant validity testing

	CL	CRS	CT	CTS	DSB
CL1	0.734	0.616	0.551	0.666	0.586
CL2	0.735	0.619	0.557	0.675	0.578
CL3	0.759	0.569	0.475	0.625	0.567
CL4	0.825	0.675	0.578	0.716	0.637
CL5	0.750	0.542	0.478	0.567	0.543
CL6	0.697	0.485	0.495	0.505	0.554
CL7	0.741	0.549	0.556	0.606	0.571
CL8	0.724	0.504	0.500	0.513	0.566
CL9	0.787	0.591	0.588	0.631	0.601
CL10	0.671	0.476	0.533	0.508	0.469
CRS1	0.551	0.747	0.570	0.617	0.586
CRS2	0.553	0.768	0.566	0.672	0.597
CRS3	0.536	0.767	0.524	0.605	0.597
CRS4	0.533	0.752	0.522	0.683	0.631
CRS5	0.609	0.764	0.607	0.657	0.661
CRS6	0.623	0.779	0.609	0.721	0.655
CRS7	0.677	0.809	0.578	0.727	0.690
CT1	0.422	0.381	0.658	0.411	0.503
CT2	0.464	0.368	0.666	0.424	0.448
CT3	0.504	0.483	0.695	0.513	0.562
CT4	0.515	0.576	0.791	0.591	0.589
CT5	0.565	0.679	0.751	0.685	0.657
CT6	0.597	0.648	0.756	0.659	0.668
CTS1	0.674	0.743	0.632	0.812	0.669
CTS2	0.665	0.709	0.659	0.794	0.700
CTS3	0.629	0.684	0.619	0.778	0.655
CTS4	0.625	0.679	0.587	0.784	0.642
CTS5	0.664	0.687	0.624	0.797	0.623
CTS6	0.644	0.669	0.638	0.839	0.577
CTS7	0.536	0.569	0.427	0.636	0.436
DSB1	0.568	0.583	0.598	0.561	0.755
DSB2	0.538	0.595	0.559	0.543	0.766
DSB3	0.581	0.554	0.595	0.580	0.709
DSB4	0.591	0.666	0.647	0.639	0.802
DSB5	0.637	0.696	0.609	0.661	0.781

DSB6	0.618	0.696	0.643	0.616	0.797
DSB7	0.556	0.601	0.631	0.638	0.747

The result of testing model analysis or outer model in the table 6 and figure 2 show that model that was designed in this research has fulfilled the requirements, therefore, testing can be continued to the step of structural analyzing model or inner model.

Const ruct	Indicat or	Loadin gs	Composite Reliability	Average Variance Extracted
CL	CL1	0.734	0.925	0.553
	CL2	0.735		
	CL3	0.759		
	CL4	0.825		
	CL5	0.750		
	CL6	0.697		
	CL7	0.741		
	CL8	0.724		
	CL9	0.787		
	CL10	0.671		
CR S	CRS1	0.747	0.910	0.592
	CRS2	0.768		
	CRS3	0.767		
	CRS4	0.752		
	CRS5	0.764		
	CRS6	0.779		
	CRS7	0.809		
CT	CT1	0.658	0.866	0.520
	CT2	0.666		
	CT3	0.695		
	CT4	0.791		
	CT5	0.751		
	CT6	0.756		
CT S	CTS1	0.812	0.915	0.608
	CTS2	0.794		
	CTS3	0.778		
	CTS4	0.784		
	CTS5	0.797		

DS B	CTS6	0.839	0.908	0.586
	CTS7	0.636		
	DSB1	0.755		
	DSB2	0.766		
	DSB3	0.709		
	DSB4	0.802		
	DSB5	0.781		
	DSB6	0.797		
	DSB7	0.747		

Table 6. Result of model testing analysis

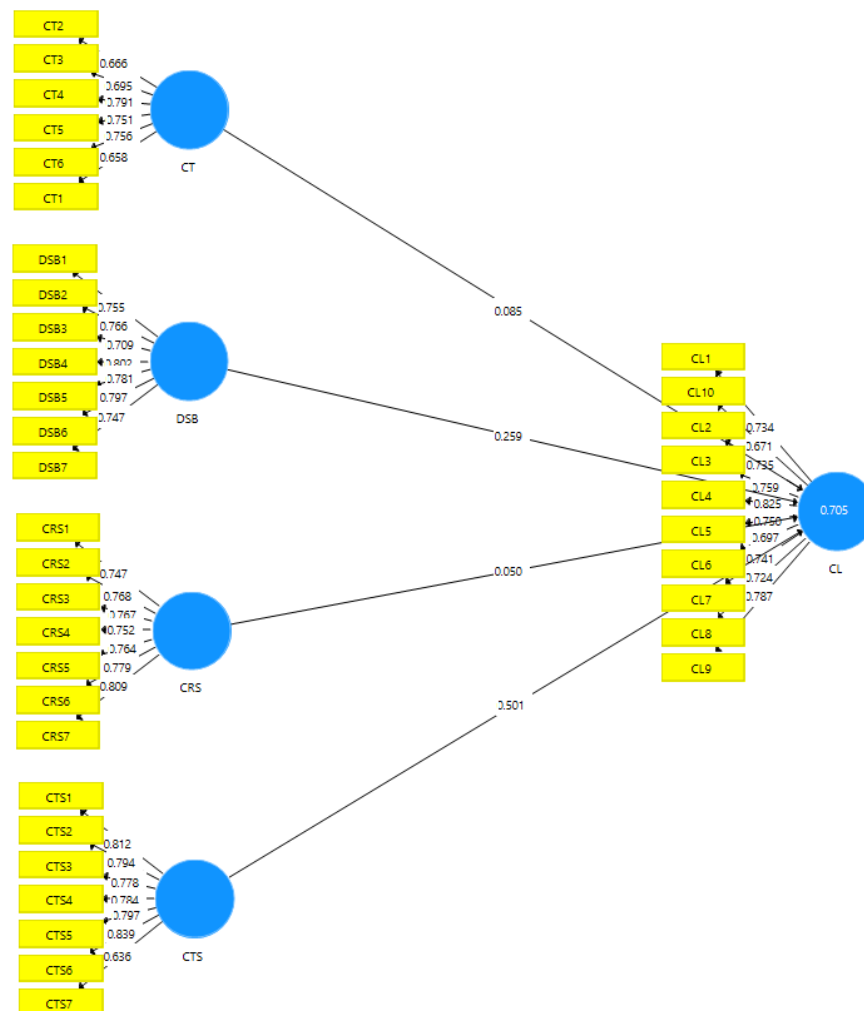


Figure 2. Result of model testing analysis

4. Results of model structure analysis (inner model)

Analysis of the model structure or inner model is conducted through several tests which include path coefficient (β), effect size (f^2), coefficient of determination (R^2) and T Statistics.

a. Path Coefficient Testing

Path coefficient (β) testing was conducted to see the strength of the relationship between constructs. The path coefficient value range is between -1 to +1, if the path coefficient value is close to +1 then the relationship between the constructs is getting stronger, conversely if the path coefficient value is close to -1 then the relationship between the constructs is getting weaker [32].

Table 7. Result of path coefficient (β) testing

Path	β
CRS -> CL	0.050
CT -> CL	0.085
CTS -> CL	0.501
DSB -> CL	0.259

Table 7 shows that path coefficient (β) testing results with the following explanation:

- 1) Direct influence between critical reading skill (CRS) and critical literacy (CL) is 0.050, and it has a positive influence. It means that CRS increases by one unit, CL can increase by 5%.
- 2) Direct influence between critical thinking (CT) and critical literacy (CL) is 0.085, and it has a positive influence. It means that CT increases by one unit, CL can increase by 5%.
- 3) Direct influence between creative thinking skill (CTS) and critical literacy (CL) is 0.501, and it has a positive influence. It means that CTS increases by one unit, CL can increase by 5%.
- 4) Direct influence between detecting source and bias (CSB) and critical literacy (CL) is 0.259, and it has a positive influence. It means that CSB increases by one unit, CL can increase by 5%.

b. Effect size (f^2) testing

Effect Size (f^2) testing aims to determine the magnitude of the influence between constructs [33]. The influence between constructs is small if the f^2 value is 0.02, the influence between constructs is moderate if the f^2 value is 0.15, and the

influence between constructs is large if the f^2 value is 0.35, whereas if the f^2 value is less than 0.02 then it is considered to have no influence [32].

Table 8. Result effect size (f^2)

Path	f^2
CRS -> CL	0.002
CT -> CL	0.008
CTS -> CL	0.173
DSB -> CL	0.055

Based on the table 8, there is a relationship between constructs that have a moderate influence, namely CTS on CL. Meanwhile, there is one construct relationship that has a small influence, namely DSB on CL. Apart from that, there are two construct relationships that have no influence, namely CRS on CL, and CT on CL.

c. Coefficient of determination (R^2) testing

The coefficient of determination (R^2) test aims to measure how much the endogenous construct can be explained by the exogenous construct. Chin stated that if the R^2 value reaches 0.67 then it is considered strong, whereas if the R^2 value is 0.33 then it is considered moderate, and if the R^2 value is 0.19 then it is considered weak [28].

Table 9. Result of coefficient of determination (R^2)

Construct of Endogen	R^2
CL	0.705

Based on table 9, the testing result R^2 shows that the influence of all constructs CRS, CT, CTS and DSB toward CL is 0.705, that means all constructs influence endogen construct CL 70.5% and includes as a strong model.

d. T Statistics testing

In this research, the T Statistics uses the bootstrapping technique to test the research hypothesis [32], which compares the T Statistics to the value of T table. This research uses an inaccuracy limit (α) = 0,05 (5%), therefore, the research

hypothesis will be accepted if P Values < 0.05 and T statistics > 1.97. The results of the T Statistics test can be seen in table 10.

Table 10. Result of T Statistics testing

Path	β	<i>Standard Deviation</i>	<i>T Statistics</i>	<i>P Values</i>
CRS -> CL	0.050	0.095	0.528	0.598
CT -> CL	0.085	0.077	1.097	0.273
CTS -> CL	0.501	0.074	6.742	0.000
DSB -> CL	0.259	0.078	3.326	0.001

The hypothesis conclusion in this study is based on the results of the T Statistics test (Table 10) as follows:

- 1) Based on calculations, the path coefficient test results for CRS on CL are 0.050 with a T Statistics value of 0.528 < 1.97 and a P value of 0.598 > 0.05 so that H1 is rejected, which means there is no direct effect of CRS on CL statistically.
- 2) The path coefficient test results for CT on CL are 0.050 with a T Statistics value of 1.097 < 1.97 and a P value of 0.273 > 0.05 so that H1 is rejected, which means there is no direct effect of CRS on CL statistically.
- 3) The path coefficient test results for CTS on CL are 0.050 with a T Statistics value of 6.742 < 1.97 and a P value of 0.000 > 0.05 so that H1 is rejected, which means there is no direct effect of CTS on CL statistically.
- 4) Based on calculations, the path coefficient test results for DSB on CL are 0.050 with a T Statistics value of 3.326 < 1.97 and a P value of 0.001 > 0.05 so that H1 is rejected, which means there is no direct effect of DSB on CL statistically.

Table 11. Result of model structure analysis

Hypotheses	Path	Conclusion
H1	CRS -> CL	Rejected
H2	CT -> CL	Rejected
H3	CTS -> CL	Accepted
H4	DSB -> CL	Accepted

Table 11 shows that the result of model structure analysis or inner model that was conducted through path coefficient (β), effect size (f^2), coefficient of

determination (R^2) and T Statistics testing. Based on the test results, it can be concluded that there are 2 hypotheses that are accepted out of 4 hypotheses.

The result of this research shows that the four variables examined has influenced on the critical literacy of pre-service teachers in ECE. However, only two variables identified, which are creative thinking (H3) and the ability in detecting source and bias (H4), have positive and significant impacts on the critical literacy of pre-service teachers. The connection is stronger than other variables which reveals the importance of the creative thinking and detecting sources and bias of information to enhance their critical literacy. Both variables have a direct link that critical literacy is closely related how sources are comprehended and how information are communicated.

One hypothesis that is accepted stating that creative thinking has a positive correlation (0.501) with critical literacy skill of pre-service teachers in Early Childhood Education. It reveals that creative thinking has a direct correlation to critical literacy. Creative thinking involves design or imaginative though to produce a solution in the most authentic way [34]. These attributes have influenced the way of pre-service teachers approach the critical literacy which shows in their learning. They express information through different multimodal or multiliteracies. The characteristic of ECE pre-service teachers to perform tasks related to multimodal and multiliteracies. literacy education researchers have come to understand literacy as much more, recognising that knowledge is both acquired and managed by teachers and learners through multiple modes, including gesture, space and sound. The type of assignment has integrated them to create content that elaborate multimodal to be used on teaching young children. Multimodal-meaning making, therefore, includes what we can 'see, hear and feel' Barton [34], Smith [25], as communication is not just through words. As such, the arts offer significant possibilities for expanding traditional notions of literacy and for building children's capacities for multimodal meaning making.

The pre-service teachers also actively communicate through language mode only or being fluent in what is expressed verbally. This requires them to express my thoughts in oral and written media in the most authentic way. As a result, their understanding of the expression of information through four models of literacy practice (coding breaker, text participant, text user, and text analyst) has enabled them to be creative user to obtain and deliver information [22]. This is the main influenced of their engage to critical literacy.

Another hypothesis shows that the ability of detecting source and bias has a positive and significant correlation to pre-service critical literacy (0.259). This shows that the way of pre-service teachers engages with information that they not only evaluate the given information but also actively combine it with different sources of information. This supports the study from Howard and Miller [36], social studies teacher integrating literacy practices into her classroom by using question techniques and integrating of variety of text sources. This part of critical literacy that allow student to search different information from videos, texts, or any visual representation. At the same time, this helps both students and teachers to construct and share knowledge as well as engaging in flexibility as readers of content-area texts (Howard *et al.*, 2020). Through this collective and shared information, the bias information can be avoided.

Based on the results of the study, it was concluded that users of creative thing and detecting source and bias have direct correlation to critical literacy. Pre-service teachers of ECE need to engage in more authentic activity to obtain information from various of source and produce in multimodal approach. Both can be achieved through modifying the type of assessment to require them to exercise their higher-order thinking, including their creative thinking, through doing case studies. For example, in the field of ECE, pre-service teachers often have to conduct an observation assignment where they have to observe children's development. This assignment should be structured to cover students' background knowledge, reading, and comprehension research papers on children's development. Importantly, Shanahan and Shanahan (2012) remind us that in comprehending text, clear guidance and instruction should be provided not only some general strategies across content areas but what details and information are needed in the focus discipline. Through a holistic observation of children's development, pre-service teachers can understand how to plan and create meaningful learning for children as demanded in creative thinking ability.

4. CONCLUSION

Critical literacy of pre-service teachers as a demand skill in the education has shown a significant correlation to creative thinking ability and the ability to detect source and bias in information. The pre-service teachers in the content areas of Early Childhood Education (ECE) reveals that both abilities to gain and produce information in multimodal and in authentic ways has engaged them with critical literacy. These two variables are closely related to the literacy practice in the ECE, which train pre-service teachers to be the actively using current information as part of developing their materials to attract young children in the process of learning.

REFERENCES

- [1] OECD (2018) 'PISA 2018 reading literacy framework', *PISA 2018 Assessment and Analytical Framework*.
- [2] Adawiyah, P. R. and Juariyah (2021) 'Peningkatan Budaya Literasi Bagi Masyarakat', *Ilmu Komunikasi*.
- [3] Sumirah, S. *et al.* (2023) 'Digital Teaching , Material Need Students Write Information on Fiction and Nonfiction Book Based on Critical Literacy in Junior High School', pp. 719–723
- [4] Shanahan, T. and Shanahan, C. (2012) 'What is disciplinary literacy and why does it matter?', *Topics in Language Disorders*, 32(1), pp. 7–18. doi: 10.1097/TLD.0b013e318244557a.
- [5] Mills, K. A. *et al.* (2019) *Literacy Education and Indigenous Australians: Theory, Education and Practice*.
- [6] Kaya, J., Dressler, R. and Lenters, K. (2022) 'Critical Literacy in Canada: A Systematic Review of Curricula and Literature', *Language and Literacy*, 24(2), pp. 25–61. doi: 10.20360/langandlit29606.
- [7] López, M. M. (2020) 'Linking Community Literacies to critical literacies through community language and literacy mapping', *Teaching and Teacher Education*, 87. doi: 10.1016/j.tate.2019.102932.
- [8] Holyoke, E. and Ries, E. (2023) "'I Didn't Think About That Perspective": Preservice Teachers' (Dis)comfort in Applying Critical Literacy and Race-Visible Discourse', *Literacy Research and Instruction*. Routledge, 00(00), pp. 1–21. doi: 10.1080/19388071.2023.2208184.
- [9] Hastuti, S. and Lestari, N. A. (2018) 'Gerakan Literasi Sekolah: Implementasi Tahap Pembiasaan Dan Pengembangan Literasi Di Sd Sukorejo Kediri', *Jurnal Basataka (JBT)*, 1(2), pp. 29–34. doi: 10.36277/basataka.v1i2.34.
- [10] S.Ifadah, A. (2020) 'Literasi : Pemahaman Literasi Baca - Tulis Anak Usia Dini Pada Mahasiswa PIAUD Semester 4 Universitas Muhammadiyah Gresik', *Jurnal Golden Age*, 4(02), pp. 290–296. doi: 10.29408/jga.v4i02.2419.
- [11] Grifenhagen, J. F. and Dickinson, D. K. (2023) 'Preparing Pre-Service Early Childhood Teachers to Support Child Language Development', *Journal of Early Childhood Teacher Education*. Routledge, 44(1), pp. 95–117. doi: 10.1080/10901027.2021.2015491.
- [12] Ilomäki, L. *et al.* (2023) 'Critical digital literacies at school level: A systematic review', *Review of Education* , (August), pp. 1–28. doi: 10.1002/rev3.3425.
- [13] Suryana, D. (2021) 'Pendidikan Anak Usia Dini (Teori dan Praktik Pembelajaran)', *UNP Press Padang*.
- [14] Nurhayati, S. and Rakhman, A. (2017) 'Studi Kompetensi Guru Paud Dalam Melakukan Asesmen Pembelajaran Dan Perkembangan Anak Usia Dini Di Kota Cimahi', *Jurnal Pendidikan Anak*, 6(2), pp. 109–120. doi: 10.21831/jpa.v6i2.17699.
- [15] Kelly, L. B. and Djonko-Moore, C. (2022) 'What Does Culturally Informed Literacy Instruction Look Like?', *Reading Teacher*. doi: 10.1002/trtr.2068.
- [16] Law, H.-Y. (2020) 'Critical literacy in early childhood education: Questions that

- prompt critical conversations', *He Kupu*.
- [17] Parry, B. L. and Taylor, L. (2021) 'Emergent digital authoring: Playful tinkering with mode, media, and technology', *Theory into Practice*. doi: 10.1080/00405841.2020.1857127.
- [18] Sari, D. Y. (2017) 'Peran Guru dalam Menumbuhkan Literasi Melalui Bermain Pada Anak Usia Dini', *Golden Age: Jurnal Pendidikan Anak Usia Dini*, 1(2). doi: 10.29313/ga.v1i2.3316.
- [19] Persada, S. S. and Ediyono, S. (2022) 'Membangun Keterampilan Berpikir: Potensi Guru Sejarah dalam Mempromosikan Literasi Kritis', *Social, Humanities, and Educational Studies (SHEs): Conference Series*, 5(3), p. 174. doi: 10.20961/shes.v5i3.59317.
- [20] Yoon, H. S. (2020) 'Critically Literate Citizenship: Moments and Movements in Second Grade', *Journal of Literacy Research*, 52(3), pp. 293–315. doi: 10.1177/1086296X20939557.
- [21] Bloome, D. and Enciso, P. (2006) 'Looking out across columbus: What we mean by "multiple literacies"', *Theory into Practice*. doi: 10.1207/s15430421tip4504_2.
- [22] Luke, A. (2018) 'Critical Literacy, School Improvement, and the Four Resources Model', in *Global Conversations in Literacy Research*. doi: 10.4324/9781315182360-1.
- [23] Martinez-lejarreta, L. (2023) "I'll need my magnifying glass":'
- [24] Jones, P. and Edwards-Groves, C. (2021) 'Rethinking School Literacy Progressions', *Transition and Continuity in School Literacy Development*, (February 2023). doi: 10.5040/9781350148871.ch-001.
- [25] Potter, J. (2022) 'Critical analysis of critical thinking', *Journal of Media Literacy Education*, 14(1), pp. 108–123. doi: 10.23860/JMLE-2022-14-1-8.
- [26] Sonu, D. and Yoon, H. (2020) 'Culturally Constructed Childhood(s): Expanding the Meaning of the Child in Teacher Education', *New Educator*. Routledge, 16(2), pp. 101–105. doi: 10.1080/1547688X.2020.1738807.
- [27] Cantrell, S. C. et al. (2023) 'The Impact of Professional Development on Inservice Teachers' Culturally Responsive Practices and Students' Reading Achievement', *Literacy Research and Instruction*. Routledge, 62(3), pp. 233–259. doi: 10.1080/19388071.2022.2130117.
- [28] Anuraga, G., Sulistiyawan, E. and Munadhiroh, S. (2017) 'Structural Equation Modeling-Partial Least Square Untuk Pemodelan Indeks Pembangunan Kesehatan Masyarakat (IPKM) Di Jawa Timur', *Seminar Nasional Matematika dan Aplikasinya*, p. 257.
- [29] Hair, J. F. et al. (2014) 'Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research', *European Business Review*. doi: 10.1108/EBR-10-2013-0128.
- [30] Hair, J. et al. (2010) 'Multivariate Data Analysis: A Global Perspective', in *Multivariate Data Analysis: A Global Perspective*.
- [31] Henseler, J., Ringle, C. M. and Sinkovics, R. R. (2009) 'The use of partial least squares path modeling in international marketing', *Advances in International Marketing*. doi: 10.1108/S1474-7979(2009)0000020014.
- [32] Sarstedt, M., Ringle, C. M. and Hair, J. F. (2021) 'Partial Least Squares Structural Equation Modeling', in *Handbook of Market Research*. doi: 10.1007/978-3-319-57413-4_15.

- [33] Kwong-Kay Wong, K. (2013) 'Partial Least Squares Structural Equation Modeling (PLS-SEM) Techniques Using SmartPLS', *Marketing Bulletin*.
- [34] Barton, G. (2019) *DEVELOPING LITERACY AND THE ARTS IN SCHOOLS*, *Developing Literacy and the Arts in Schools*. doi: 10.4324/9780429316067.
- [35] Smith, T. *et al.* (2022) 'Editors'.
- [36] Howard, C. M. and Miller, S. (2017) 'Middle-School Teachers' Enacted Beliefs: Negotiating the Nonnegotiables of High-Stakes Accountability Policies', *Middle Grades Research Journal*.
- [37] Howard, C. *et al.* (2020) 'Engaging Literacy Experiences in History Classrooms: A Multiple Case Study of Novice Teachers' Beliefs and Practices', *Literacy Research and Instruction*. Routledge, 60(1), pp. 1–20. doi: 10.1080/19388071.2020.1779878.

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